Modeling the Excitation of EMIC Waves from a Source Population in the Plasmasheet

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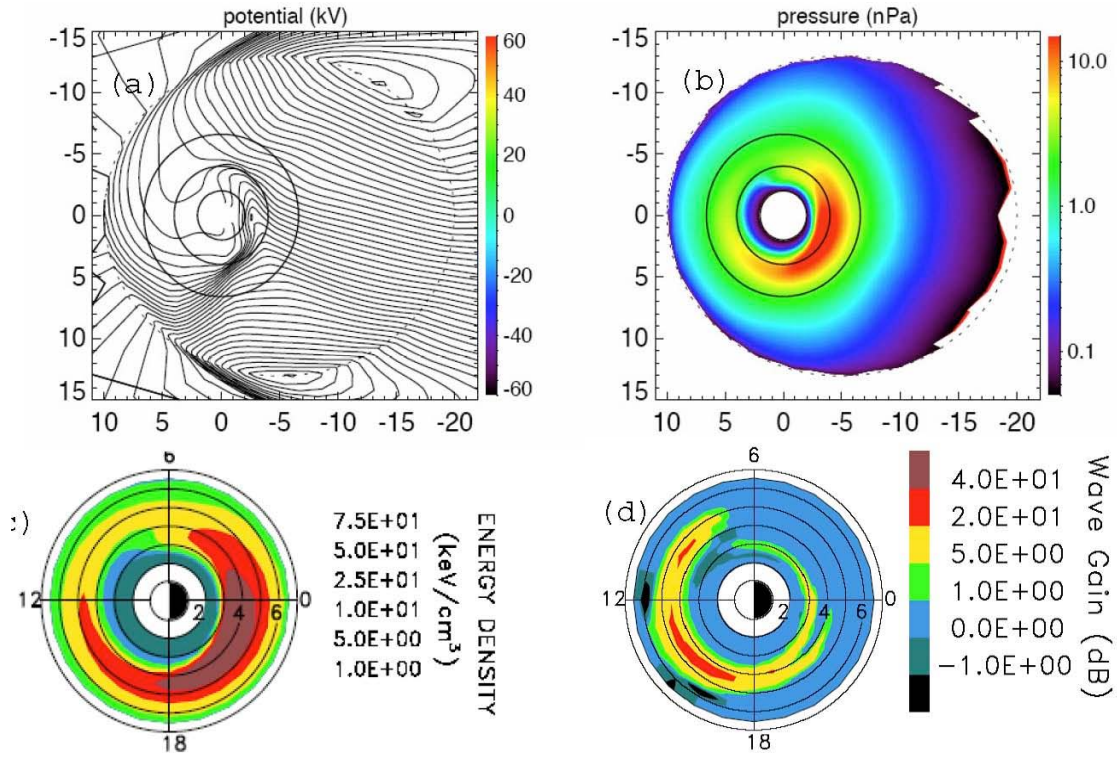
Electromagnetic ion cyclotron (EMIC) waves are excited in the inner magnetosphere following the inward convective injection of plasmasheet particles during geomagnetically active conditions to populate the stormtime ring current. The waves play an important role in the dynamical evolution of the ring current and the radiation belts, by causing scattering lo to the atmosphere. The global dynamic evolution of ring current ions during the April 22, 2001 magnetic storm was modeled with the RAM (Ring current-Atmosphere interaction Model) code using global electric fields, and particle fluxes near geostationary orbit obtained from a force balanced version of the RCM code. The result is an ability to determine the influence of solar wind variability on the inner magnetosphere, and identify the spatial locations for wave excitation. During the main phase of the April storm the wave instability increased in the afternoon sector. The global distribution of these plasma waves is a fundamental requirement for modeling the dynamical variability of the ring current and the radiation belts.

Simulation at minimum *Dst*=-100 nT as function of MLT and radial distance in the equatorial



plane. (top) Results of a RCM run: (a) electric potentials, and (b) plasma pressure. (bottom) RAM simulation: (c) proton energy density, and (d) gain of He+ band EMIC waves.